

09/06/23

TIP PROJECT: R-5809A

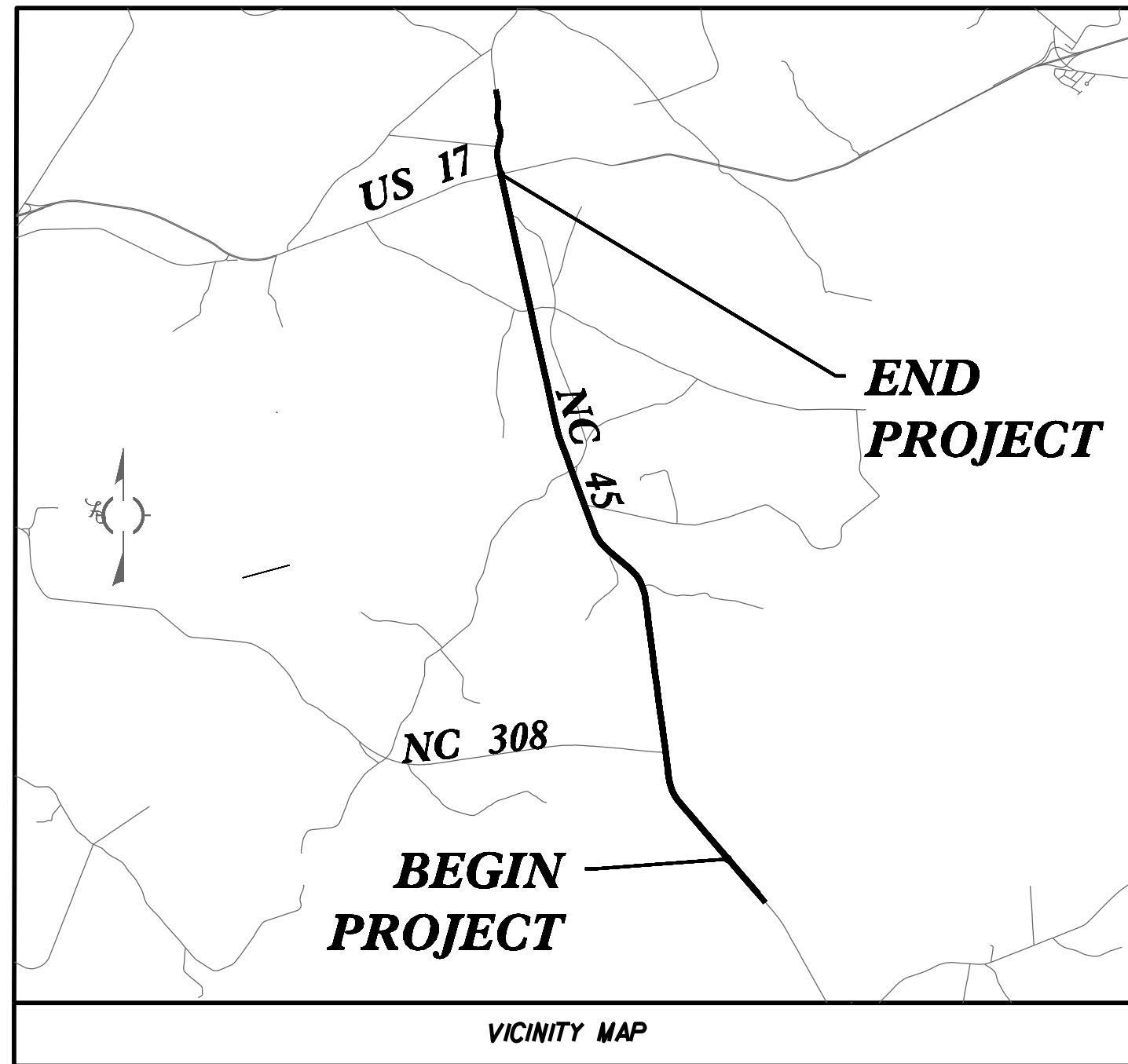
CONTRACT: 6/23/2023

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BERTIE COUNTY

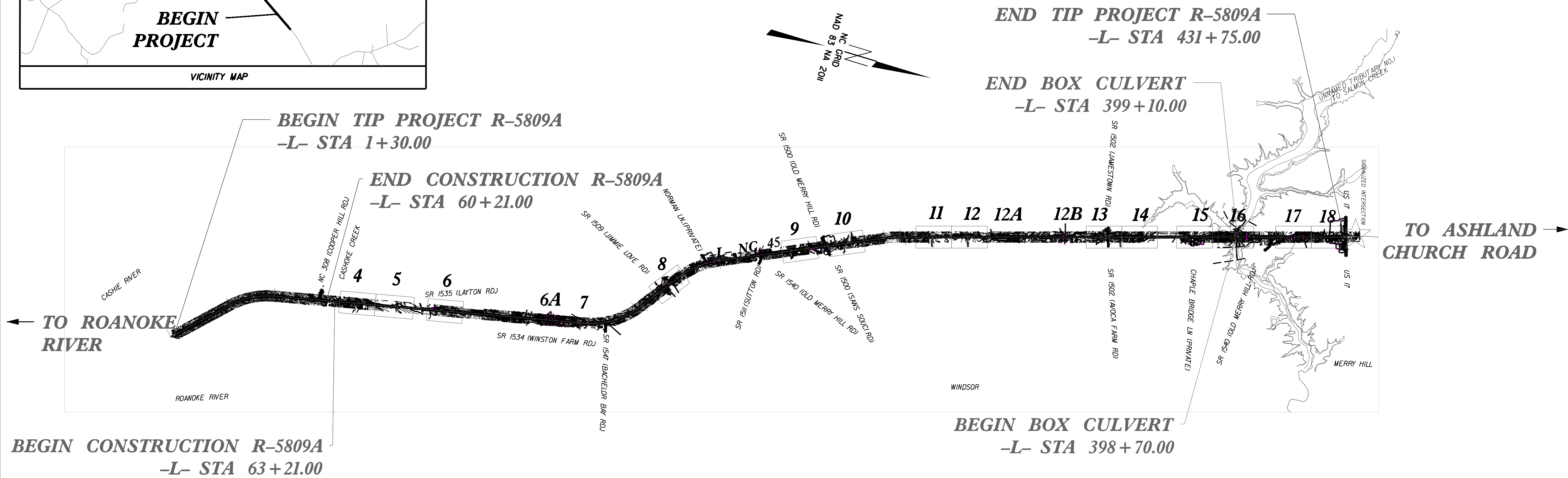
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5809A	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
46976.1.2		PE	
46976.2.2		RW	
46976.2.5		UTIL	

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UNLESS ALL SIGNATURES COMPLETED**



LOCATION: NC 45 WASHINGTON COUNTY LINE TO US 17 AT MIDWAY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, AND BOX CULVERT



STRUCTURES

DESIGN DATA	
ADT 2022	= 3,200
ADT 2044	= 4,100
K	= 8%
D	= 52%
T	= 22%
V	= 60 MPH
CLASSIFICATION: MAJOR COLLECTOR	
* 17% TTST 5% DUAL REGIONAL TIER	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-5809A	= 8.206 MILES
LENGTH OF STRUCTURE TIP PROJECT R-5809A	= .008 MILES
TOTAL LENGTH TIP PROJECT R-5809A	= 8.214 MILES

Prepared in the Office of:

Kimley»Horn

2018 STANDARD SPECIFICATIONS

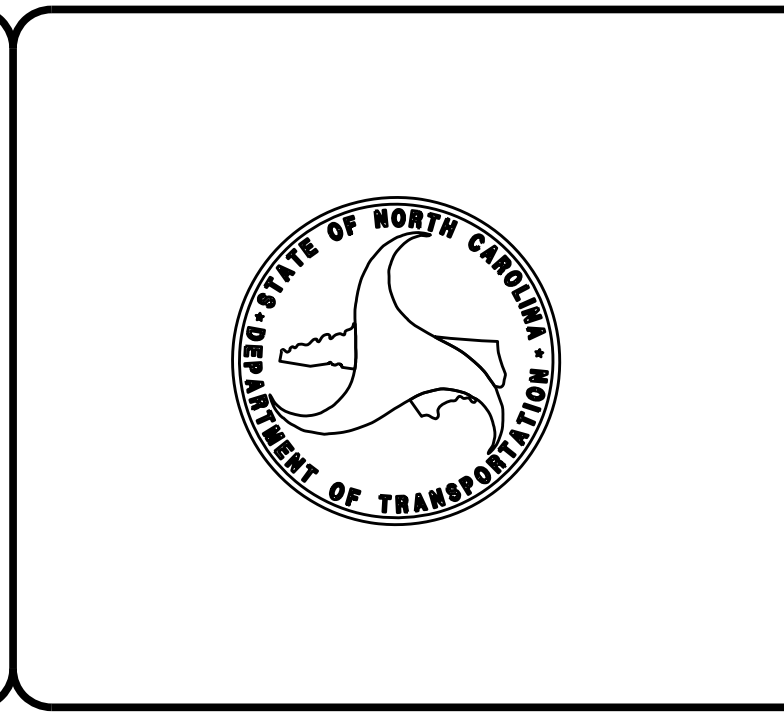
RIGHT OF WAY DATE:
JUNE 23, 2023

LETTING DATE:
JANUARY 21, 2025

VINCENT RICCIO, PE
PROJECT ENGINEER

ANDREW L. PHILLIPS, P.E.
PROJECT DESIGN ENGINEER

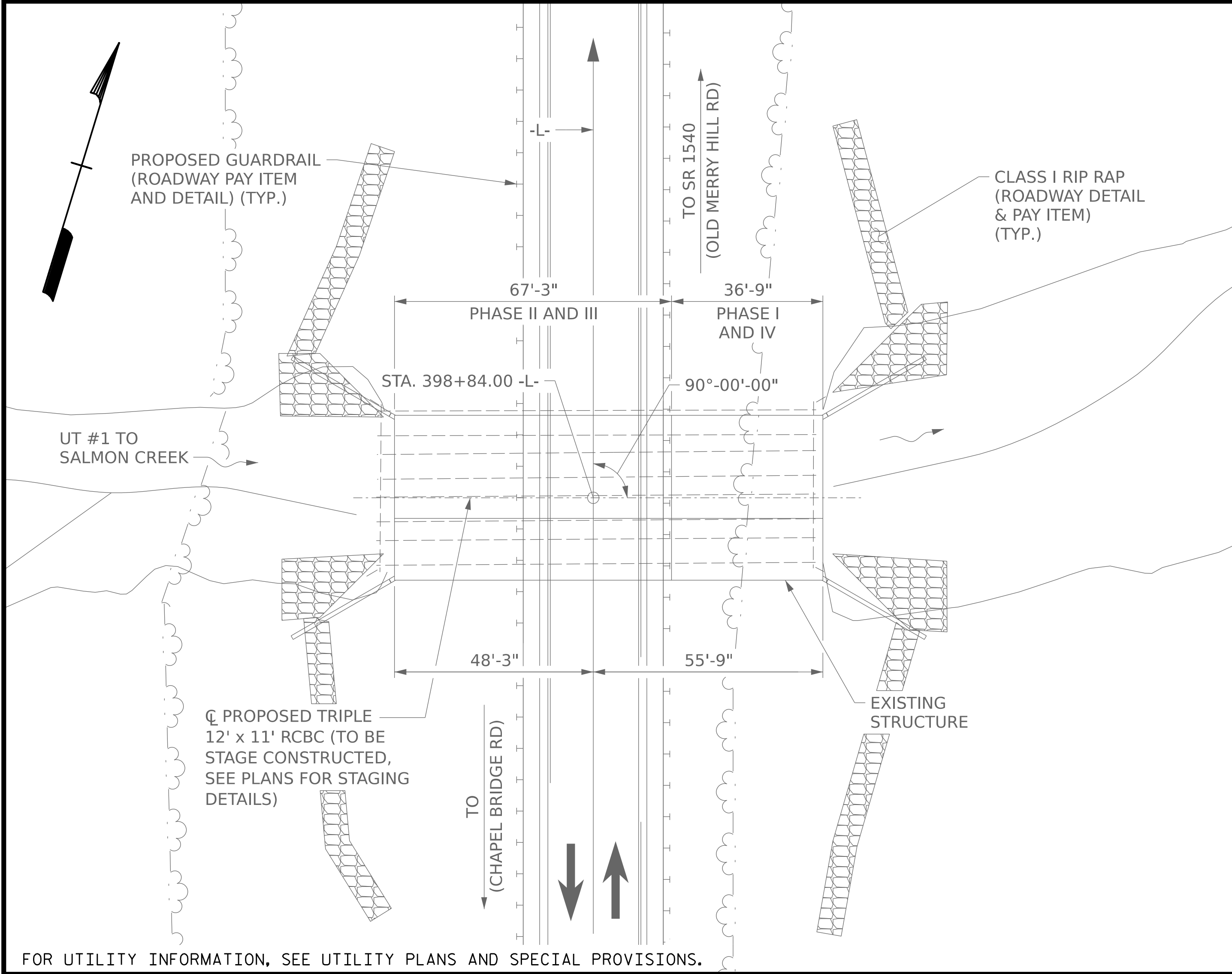
ROGER BULLOCK
PROJECT MANAGER
NCDOT HIGHWAY DIVISION



BENCHMARK: STA. 356+56.44 -L-, COURSE FROM R5809A-1 TO BL42: R5809A-1 (GPS MON) STA. 5+00 -L-, N 835010 E 2656143 ELEV. 20.77 NAD 88

NOTES

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- DESIGN FILL = 11.00 FT.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR POURING SEQUENCE OF CONCRETE IN CULVERT, SEE "STAGING DETAILS", SHEET C1-2.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACES OF THE EXTERIOR WALLS AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- THE REINFORCED CONCRETE BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FT. BLANKET OF FOUNDATION CONDITIONING MATERIAL. SEE SECTION 414 OF THE STANDARD SPECIFICATIONS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.
- FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- TRAFFIC ON NC 45 SHALL BE MAINTAINED. IN ORDER TO MAINTAIN TRAFFIC THE CULVERT SHALL BE CONSTRUCTED IN SECTIONS AS SHOWN ON THESE PLANS AS DIRECTED BY THE ENGINEER.
- AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 4 @ 72" RCP WITH HEAD-WALL AND WINGWALLS; 106' ALONG CENTERLINE OF CULVERT WITH 22' CLEAR ROADWAY AND LOCATED AT THE SITE SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE STRUCTURE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- SEE SECTION 414 OF THE STANDARD SPECIFICATIONS FOR CULVERT EXCAVATION AND BACKFILLING.
- EXCAVATE 1 FOOT BELOW CULVERT AND FOOTING, AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414-4 OF THE STANDARD SPECIFICATIONS.
- CULVERT BARREL SHOULD BE BACK FILLED WITH NATIVE MATERIAL TO BURY DEPTH (1.0'). NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE ----- 965 CFS
 FREQUENCY OF DESIGN FLOOD ----- 50 YR.
 DESIGN HIGH WATER ELEVATION ----- 11.8
 DRAINAGE AREA ----- 6.16 SQ. MI.
 BASE DISCHARGE (Q100) ----- 1170 CFS
 BASE HIGH WATER ELEVATION ----- 12.6

OVERTOPPING FLOOD DATA

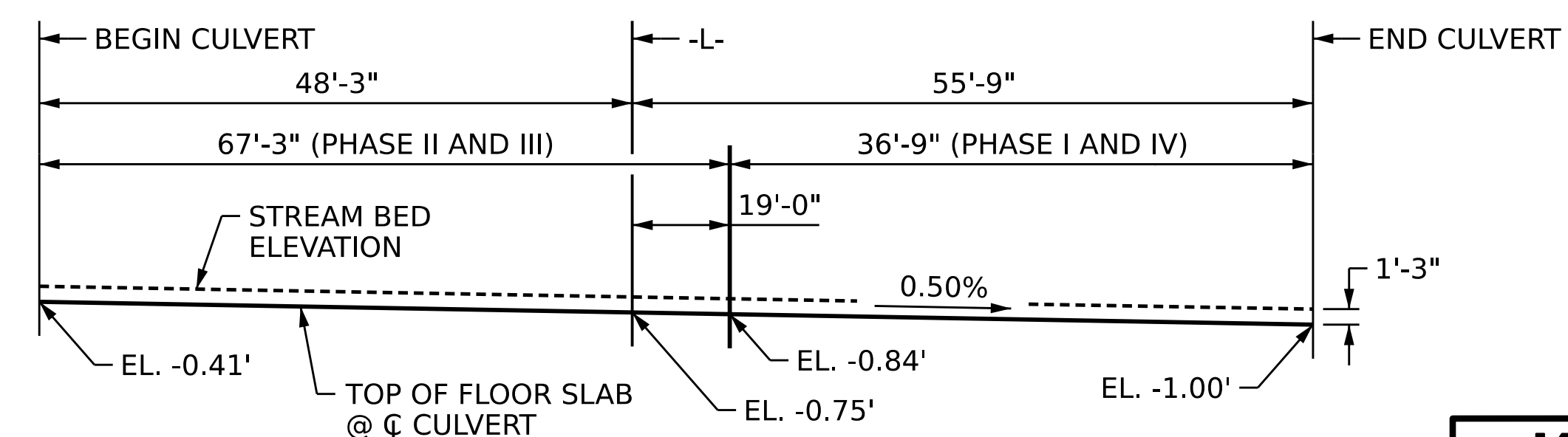
OVERTOPPING DISCHARGE ----- 6400 CFS
 FREQUENCY OF OVERTOPPING FLOOD --- >500 YR.
 OVERTOPPING FLOOD ELEVATION ----- 22.38*
 * OVERTOPPING WILL OCCUR AT STA. 398+87.50 -L-

TOTAL STRUCTURE QUANTITIES

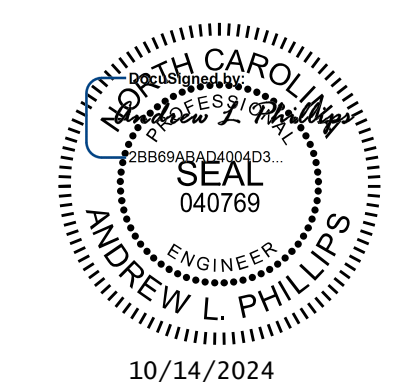
CLASS A CONCRETE	
PHASE 1	100.6 C.Y.
PHASE 2	168.0 C.Y.
PHASE 3	231.4 C.Y.
PHASE 4	135.7 C.Y.
TOTAL	635.7 C.Y.
EPOXY COATED REINFORCING STEEL	
PHASE 1	18,134 LBS.
PHASE 2	31,093 LBS.
PHASE 3	33,395 LBS.
PHASE 4	19,116 LBS.
TOTAL	101,738 LBS.
CULVERT EXCAVATION LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	
PHASE 1	44.0 TONS
PHASE 2	81.0 TONS
PHASE 3	128.0 TONS
PHASE 4	70.0 TONS
TOTAL	323.0 TONS

ROADWAY DATA

GRADE POINT EL. @ STA. 398+84.00 -L- = 22.38'
 INVERT ELEVATION @ STA. 398+84.00 -L- = -0.75'
 ROADWAY SLOPES 3 : 1



PROFILE ALONG Q CULVERT



Kimley»Horn
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601-1772
 Phone (919) 677-2000
 NC LICENSE # F-0102

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 1 OF 13 BRIDGE NO. 070165

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			
TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 90° SKEW			
REVISIONS			SHEET NO.
NO.	BY:	DATE:	C1-1
1			TOTAL SHEETS
2			13

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DRAWN BY : D. D. LOWERY DATE : 03/2024
 CHECKED BY : C. T. POOLE DATE : 03/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 03/2024

NOTES

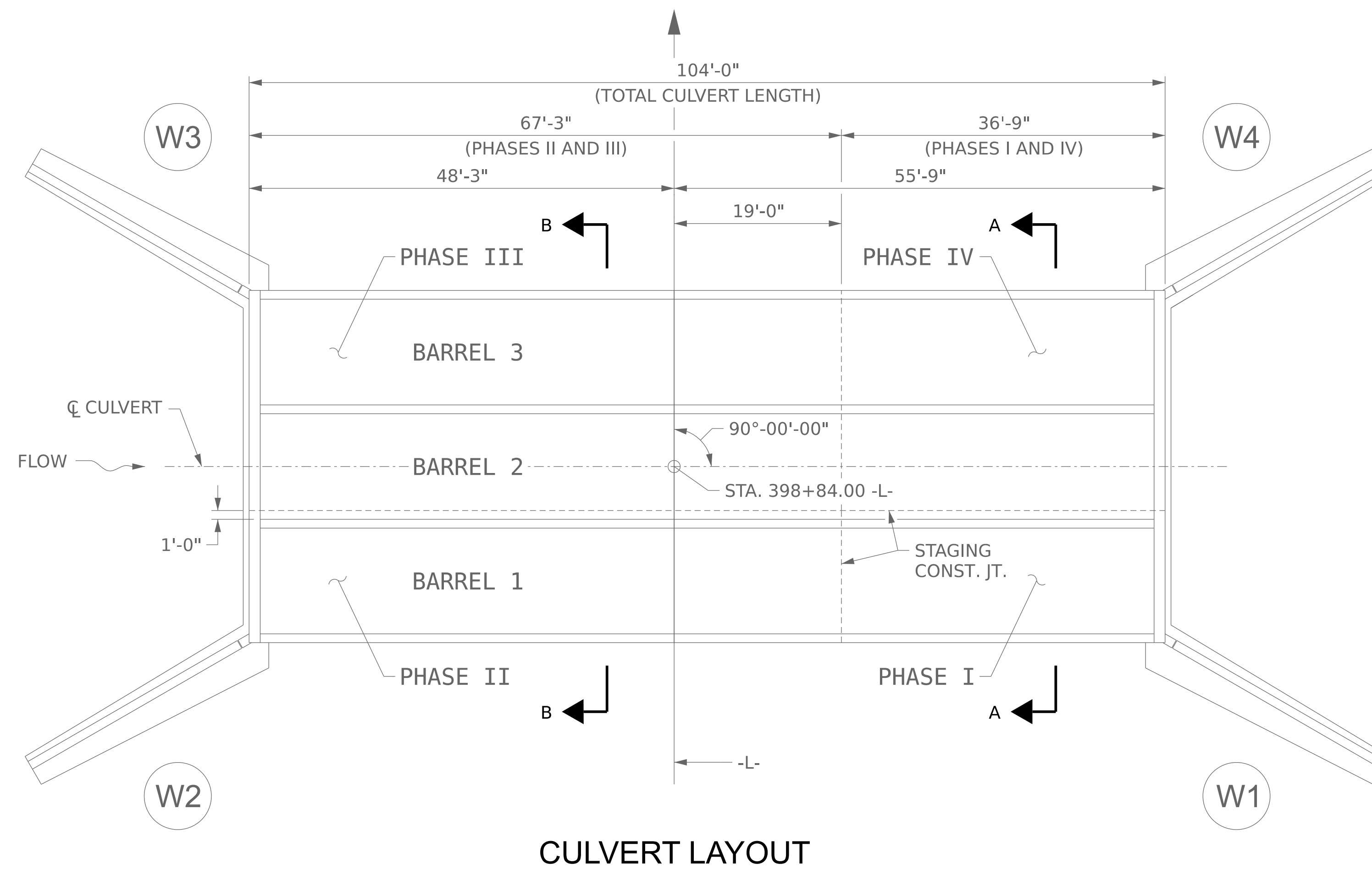
CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

PHASE I
 OUTLET WING W1; TOP AND BOTTOM SLAB INCLUDING 1'-0" EXTENSION INTO BARREL 2 AND BOTH EXTERIOR AND INTERIOR WALLS OF BARREL 1. 36'-9" LENGTH OF BARREL 1.

PHASE II
 INLET WING W2; TOP AND BOTTOM SLAB INCLUDING 1'-0" EXTENSION INTO BARREL 2 AND BOTH EXTERIOR AND INTERIOR WALLS OF BARREL 1. 67'-3" LENGTH OF BARREL 1.

PHASE III
 INLET WING W3; TOP AND BOTTOM SLAB AND BOTH EXTERIOR AND INTERIOR WALLS OF BARRELS 2 AND 3. 67'-3" LENGTH OF BARRELS 2 AND 3.

PHASE IV
 INLET WING W4; TOP AND BOTTOM SLAB AND BOTH EXTERIOR AND INTERIOR WALLS OF BARRELS 2 AND 3. 36'-9" LENGTH OF BARRELS 2 AND 3.



SECTION B-B

PHASE III
 PHASE II

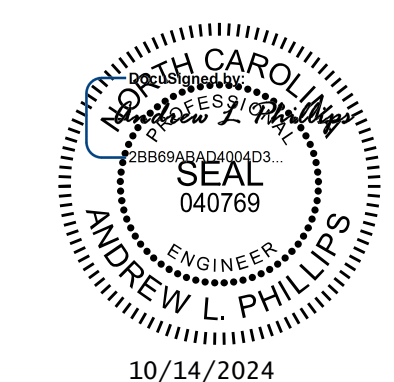


SECTION A-A

PHASE IV
 PHASE I

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-

SHEET 2 OF 13



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW**

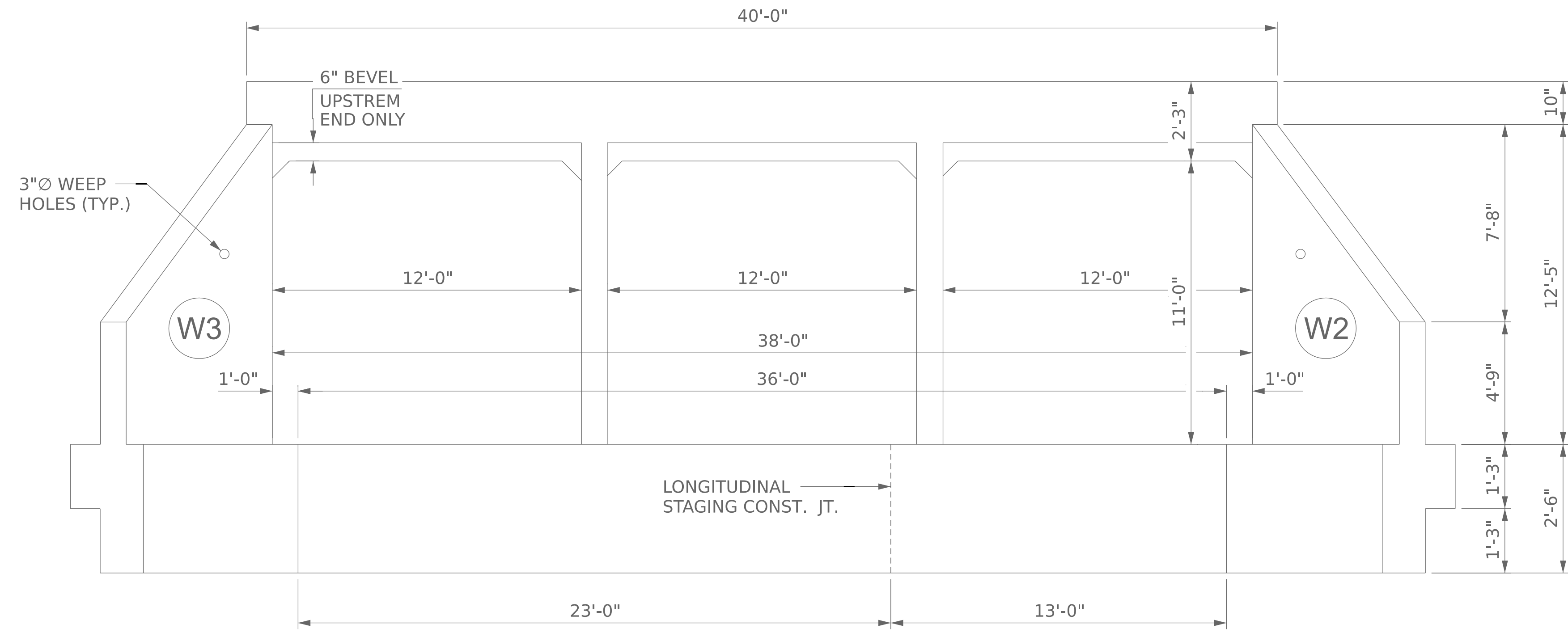
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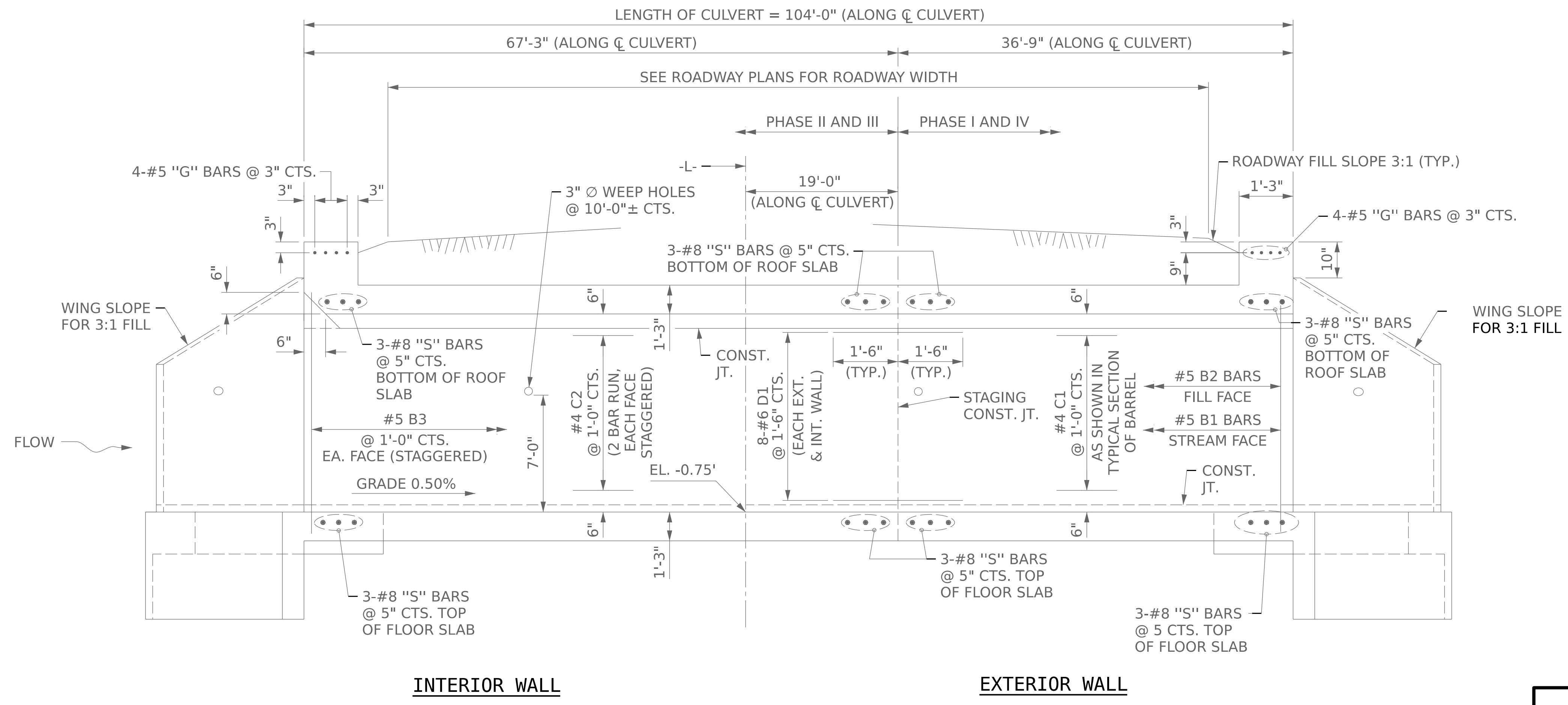
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REVISIONS						SHEET NO. C1-2
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 13
2			4			

DRAWN BY : D. D. LOWERY DATE : 02/2024
 CHECKED BY : C. T. POOLE DATE : 02/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 02/2024



INLET END ELVATION NORMAL TO SKEW
(OUTLET SIMILAR)

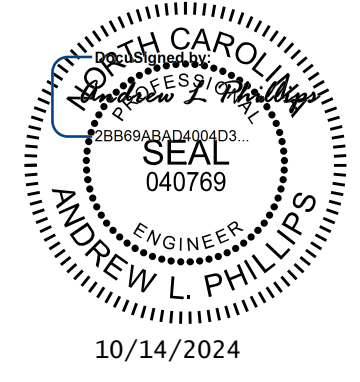


INTERIOR WALL **EXTERIOR WALL**

CULVERT SECTION NORMAL TO ROADWAY

#6 D1 DOWEL BARS IN THE SLABS NOT SHOWN FOR CLARITY.
SEE SHEETS C1-6 & C1-8 FOR SLAB DOWEL DETAILS.

PROJECT NO. R-5809A
BERTIE COUNTY
STATION: 398+84.00 -L-
SHEET 3 OF 13



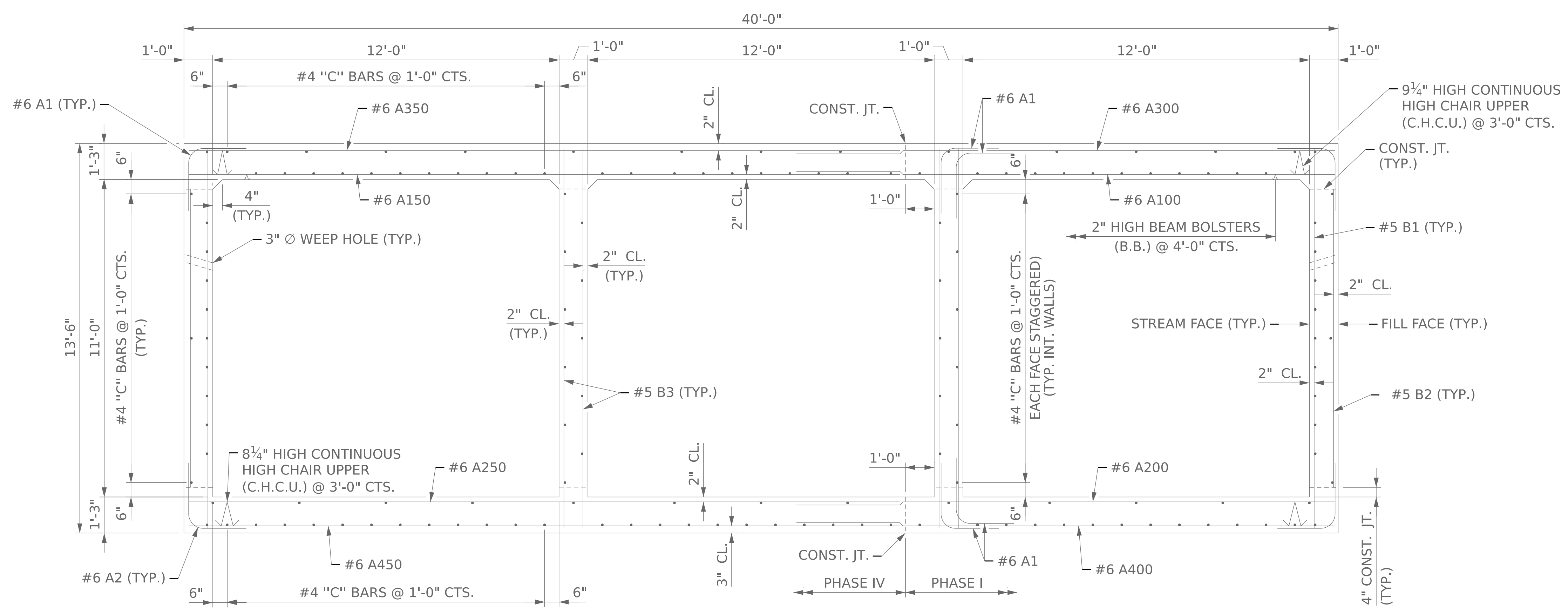
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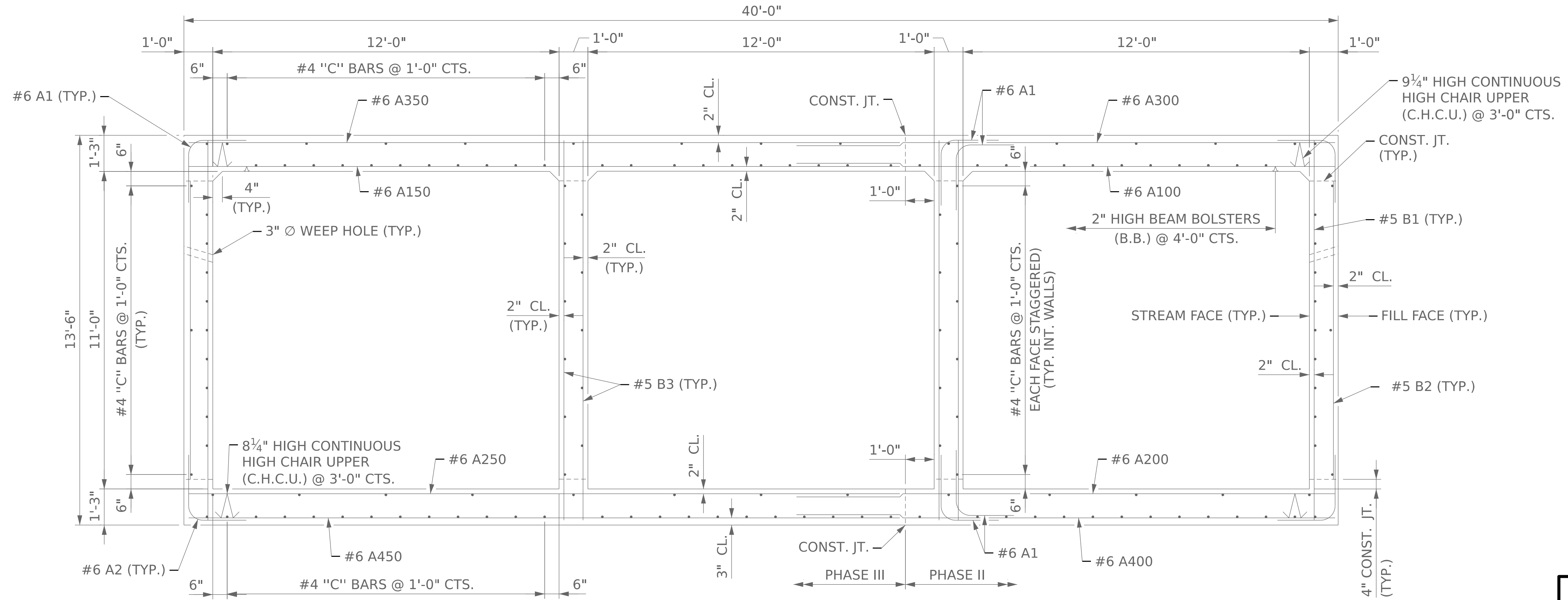
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REVISIONS						SHEET NO. C1-3
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2			4			13

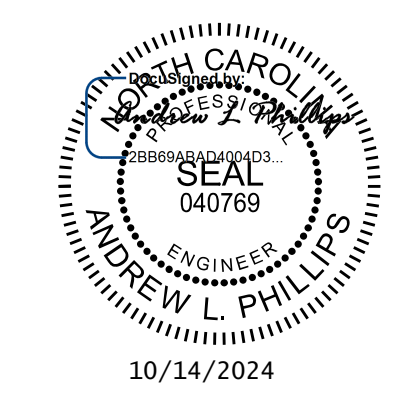


RIGHT ANGLE SECTION OF BARREL - PHASES I & IV
 THERE ARE 144 "C" BARS IN SECTION OF BARREL
 (LOOKING DOWNSTREAM)



RIGHT ANGLE SECTION OF BARREL - PHASES II & III
 THERE ARE 144 "C" BARS IN SECTION OF BARREL
 (LOOKING DOWNSTREAM)

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 4 OF 13



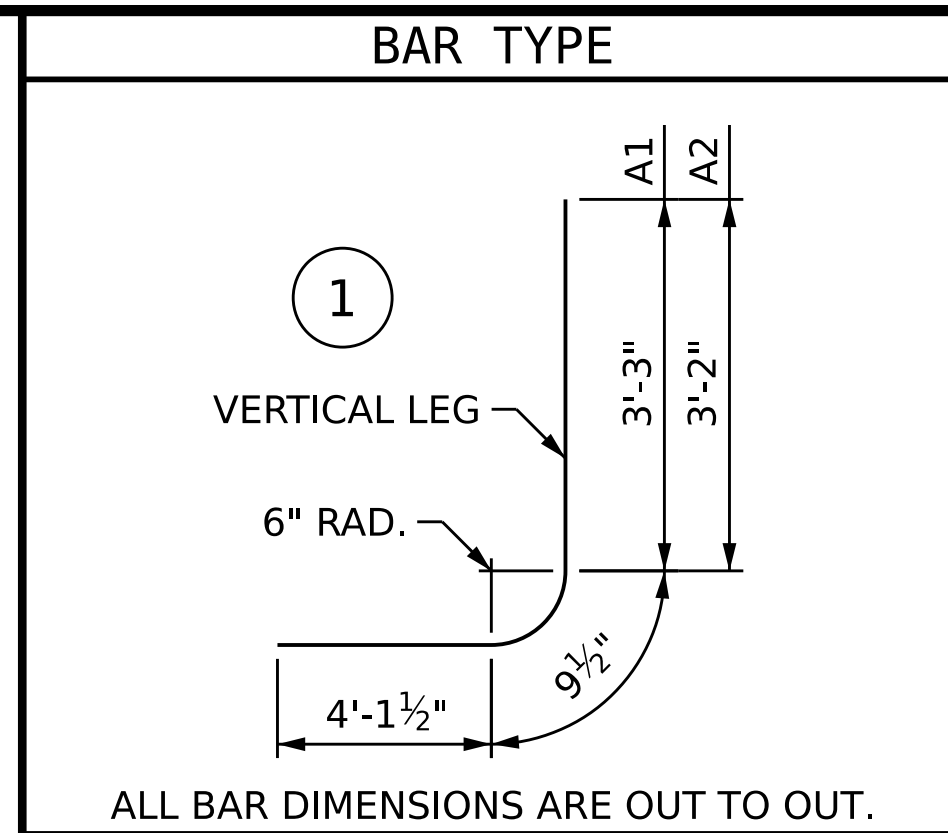
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 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW**

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 DESIGN ENGINEER OF RECORD : A. L. PHILLIPS DATE : 02/2024

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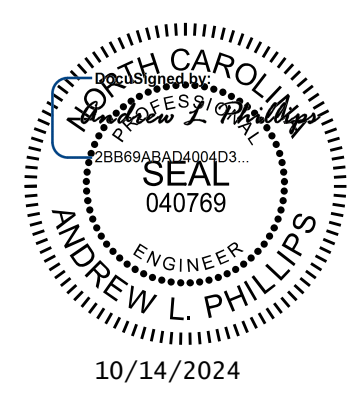


SPLICE CHART		
BAR	SIZE	SPLICE LENGTH
A100, A200, A300, A400	#6	4'-8"
C1, C2, C3, C4	#4	2'-10"
G1	#5	3'-7"
S1	#8	6'-2"

BILL OF MATERIAL (PHASE I)						BILL OF MATERIAL (PHASE II)						BILL OF MATERIAL (PHASE III)						BILL OF MATERIAL (PHASE IV)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	147	6	1	8'-2"	1,803	A1	270	6	1	8'-2"	3,312	A1	135	6	1	8'-2"	1,656	A1	73	6	1	8'-2"	895
A2	147	6	1	8'-1"	1,785	A2	270	6	1	8'-1"	3,278	A2	135	6	1	8'-1"	1,639	A2	73	6	1	8'-1"	886
A100	73	6	STR	19'-8"	2,156	A100	134	6	STR	19'-8"	3,958	A150	134	6	STR	24'-8"	4,965	A150	73	6	STR	24'-8"	2,705
A200	73	6	STR	19'-8"	2,156	A200	134	6	STR	19'-8"	3,958	A250	134	6	STR	24'-8"	4,965	A250	73	6	STR	24'-8"	2,705
A300	73	6	STR	19'-8"	2,156	A300	134	6	STR	19'-8"	3,958	A350	134	6	STR	24'-8"	4,965	A350	73	6	STR	24'-8"	2,705
A400	73	6	STR	19'-8"	2,156	A400	134	6	STR	19'-8"	3,958	A450	134	6	STR	24'-8"	4,965	A450	73	6	STR	24'-8"	2,705
B1	37	5	STR	13'-1"	505	B1	68	5	STR	13'-1"	928	B1	68	5	STR	13'-1"	928	B1	37	5	STR	13'-1"	505
B2	37	5	STR	10'-4"	399	B2	68	5	STR	10'-4"	733	B2	68	5	STR	10'-4"	733	B2	37	5	STR	10'-4"	399
B3	74	5	STR	13'-1"	1,010	B3	136	5	STR	13'-1"	1,856	B3	136	5	STR	13'-1"	1,856	B3	74	5	STR	13'-1"	1,010
C1	59	4	STR	36'-5"	1,435	C2	118	4	STR	34'-11"	2,752	C3	170	4	STR	34'-11"	3,965	C4	85	4	STR	36'-5"	2,068
D1	38	6	STR	3'-0"	171	G1	4	5	STR	18'-7"	78	D1	50	6	STR	3'-0"	225	G2	4	5	STR	24'-8"	103
G1	4	5	STR	18'-7"	78	S1	12	8	STR	21'-4"	684	G2	4	5	STR	24'-8"	103	S2	12	8	STR	24'-8"	790
S1	12	8	STR	21'-4"	684							S2	12	8	STR	24'-8"	790						
EPOXY COATED REINFORCING STEEL LBS. 16,494						EPOXY COATED REINFORCING STEEL LBS. 29,453						EPOXY COATED REINFORCING STEEL LBS. 31,755						EPOXY COATED REINFORCING STEEL LBS. 17,476					

PHASE I QUANTITIES	PHASE II QUANTITIES	PHASE III QUANTITIES	PHASE IV QUANTITIES
CLASS A CONCRETE BARREL @ 2.210 C.Y./FT. 81.2 C.Y. WINGS, ETC. 19.4 C.Y. TOTAL 100.6 C.Y.	CLASS A CONCRETE BARREL @ 2.210 C.Y./FT. 148.6 C.Y. WINGS, ETC. 19.4 C.Y. TOTAL 168.0 C.Y.	CLASS A CONCRETE BARREL @ 3.136 C.Y./FT. 210.9 C.Y. WINGS, ETC. 20.5 C.Y. TOTAL 231.4 C.Y.	CLASS A CONCRETE BARREL @ 3.136 C.Y./FT. 115.2 C.Y. WINGS, ETC. 20.5 C.Y. TOTAL 135.7 C.Y.
EPOXY COATED REINFORCING STEEL BARREL 16,494 LBS. WINGS, ETC. 1,640 LBS. TOTAL 18,134 LBS.	EPOXY COATED REINFORCING STEEL BARREL 29,453 LBS. WINGS, ETC. 1,640 LBS. TOTAL 31,093 LBS.	EPOXY COATED REINFORCING STEEL BARREL 31,755 LBS. WINGS, ETC. 1,640 LBS. TOTAL 33,395 LBS.	EPOXY COATED REINFORCING STEEL BARREL 17,476 LBS. WINGS, ETC. 1,640 LBS. TOTAL 19,116 LBS.
CULVERT EXCAVATION LUMP SUM	CULVERT EXCAVATION LUMP SUM	CULVERT EXCAVATION LUMP SUM	CULVERT EXCAVATION LUMP SUM
FOUNDATION COND. MATERIAL 44 TONS	FOUNDATION COND. MATERIAL 81 TONS	FOUNDATION COND. MATERIAL 128 TONS	FOUNDATION COND. MATERIAL 70 TONS

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 5 OF 13



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**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW**

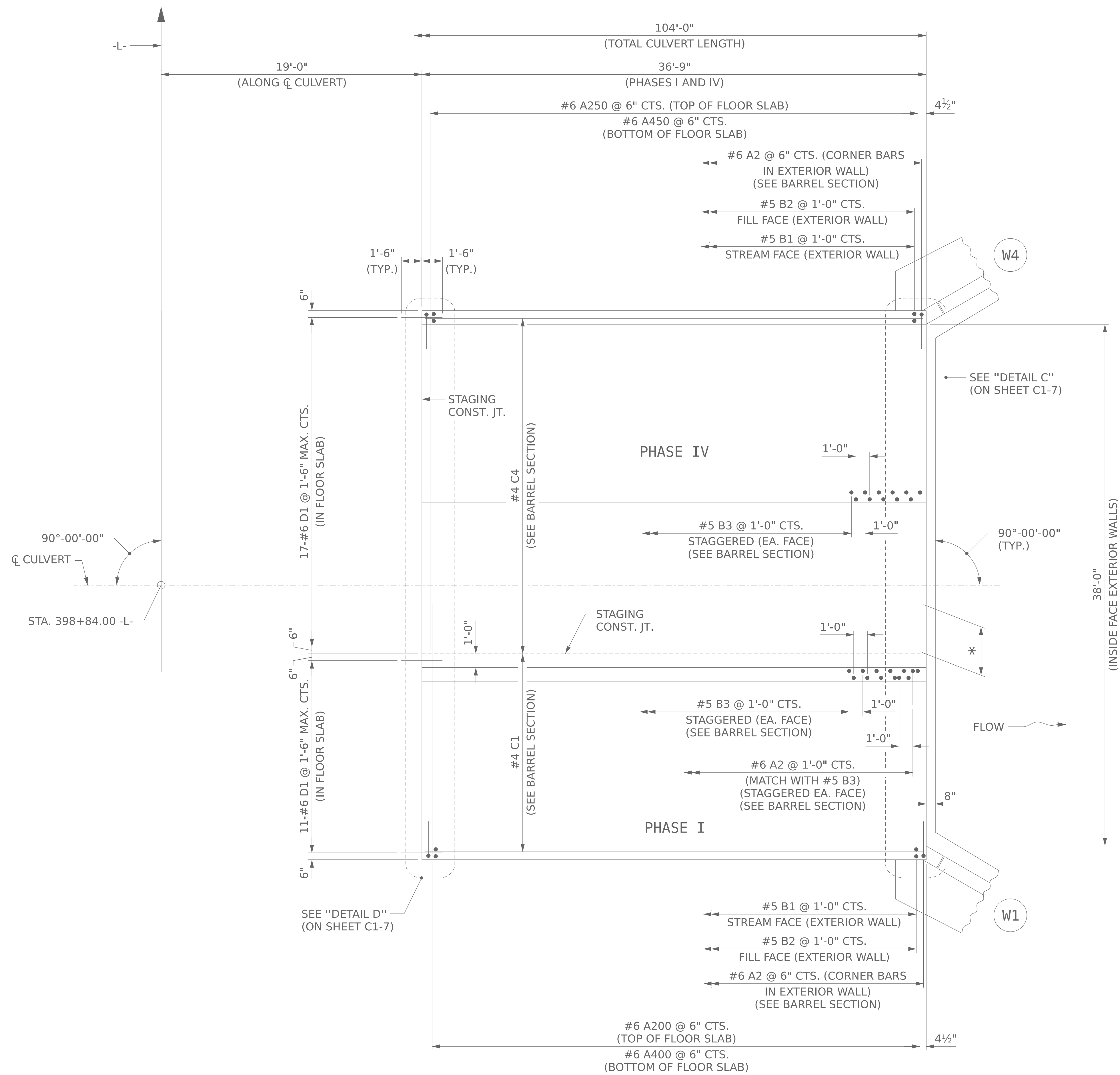
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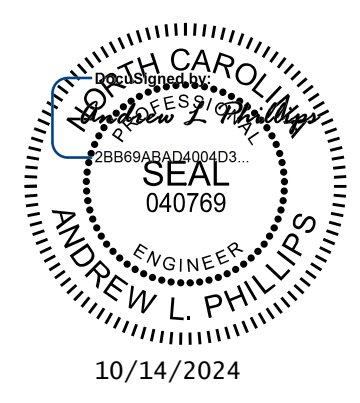
TOTAL SHEETS: **C1-5**
13



FLOOR SLAB PLAN - PHASE I AND IV

* EXTEND #6 A200 4'-10" INTO PHASE IV IN TOP OF FLOOR SLAB
 * EXTEND #6 A400 4'-10" INTO PHASE IV IN BOTTOM OF FLOOR SLAB

PROJECT NO. R-5809A
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 SHEET 6 OF 13



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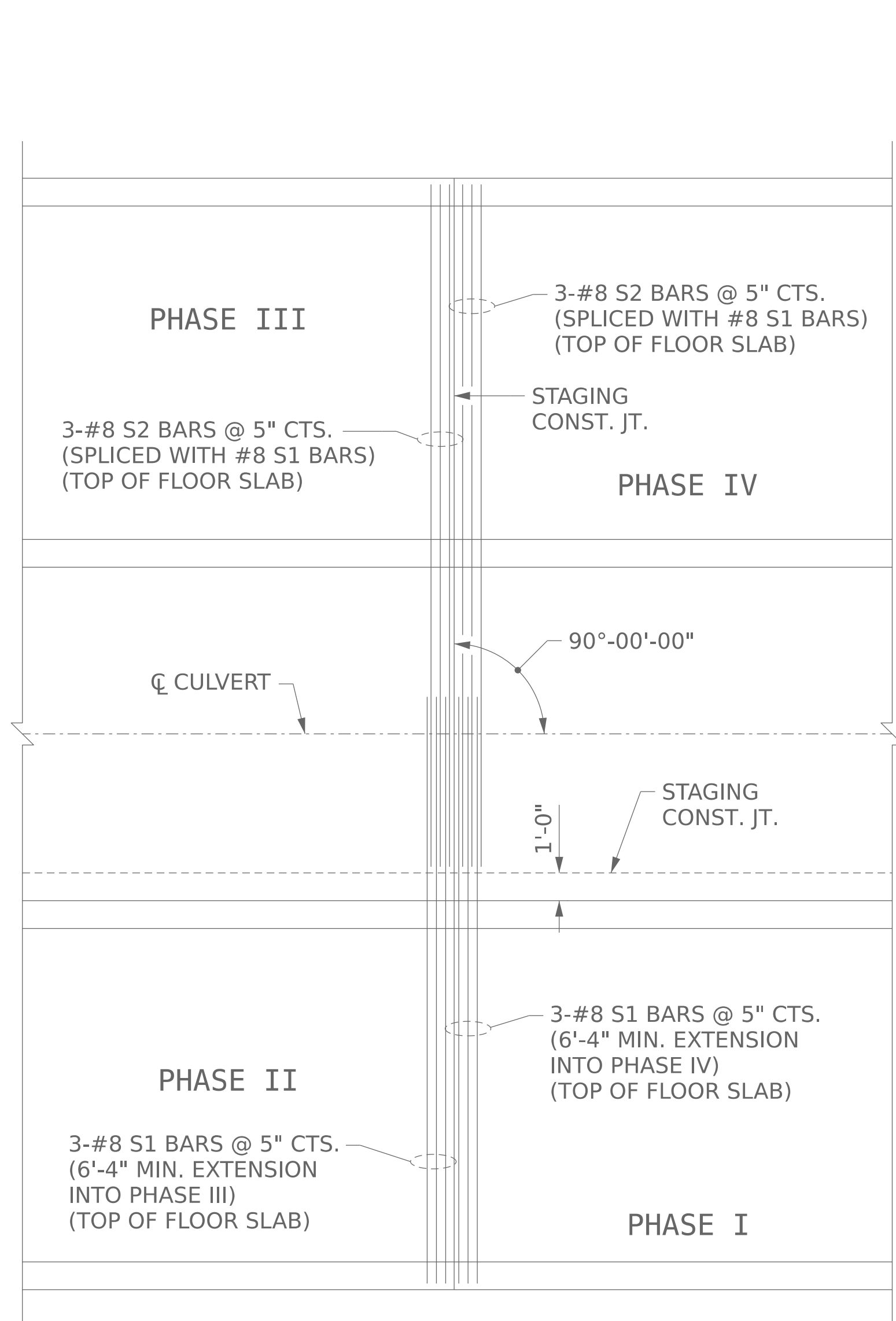
STATE OF NORTH CAROLINA
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 CONCRETE BOX CULVERT
 90° SKEW
 (PHASES I AND IV)**

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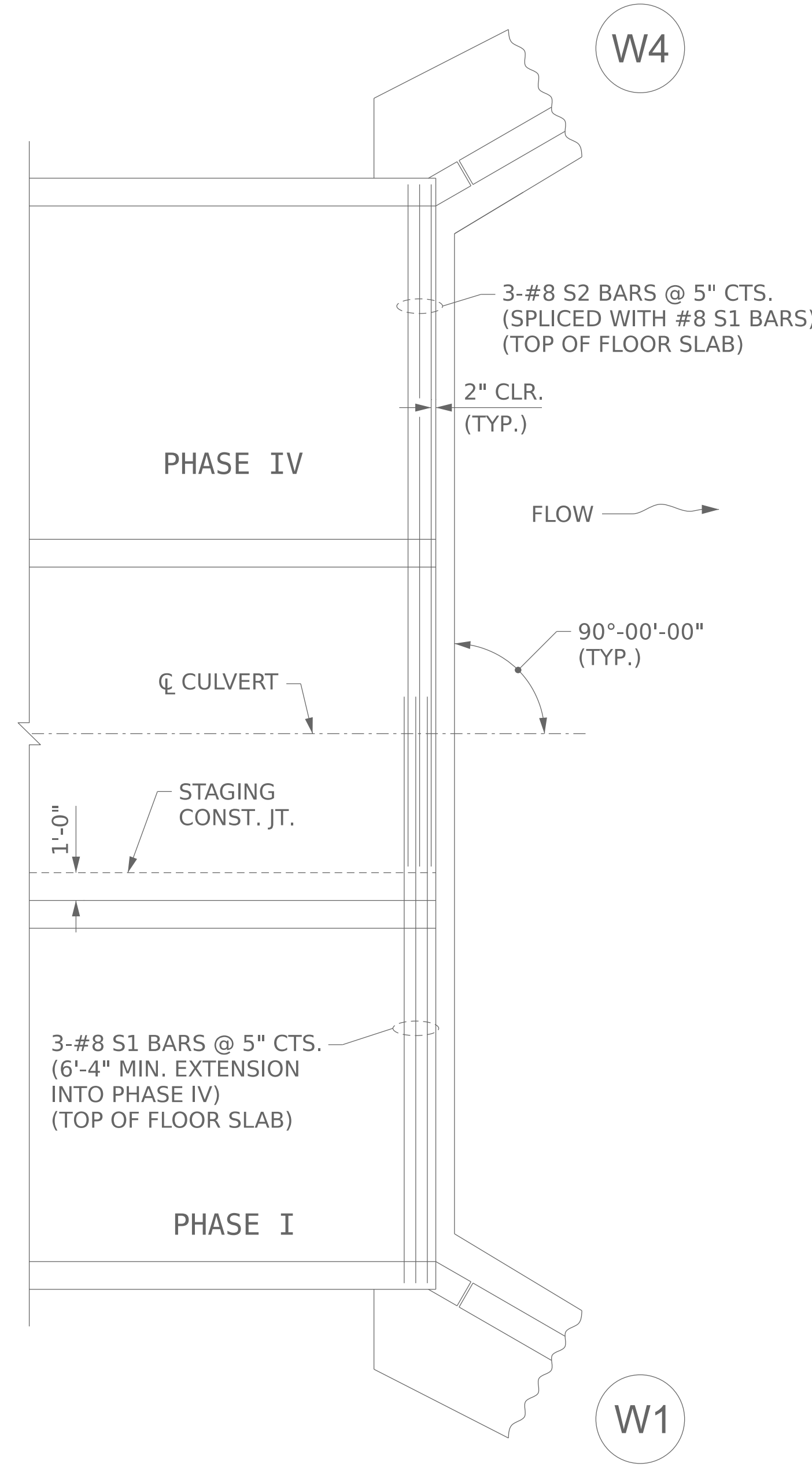
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2			4		13

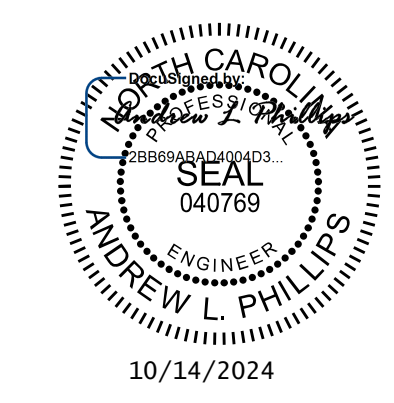


DETAIL D
#6-D1 NOT SHOWN FOR CLARITY



DETAIL C

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 7 OF 13



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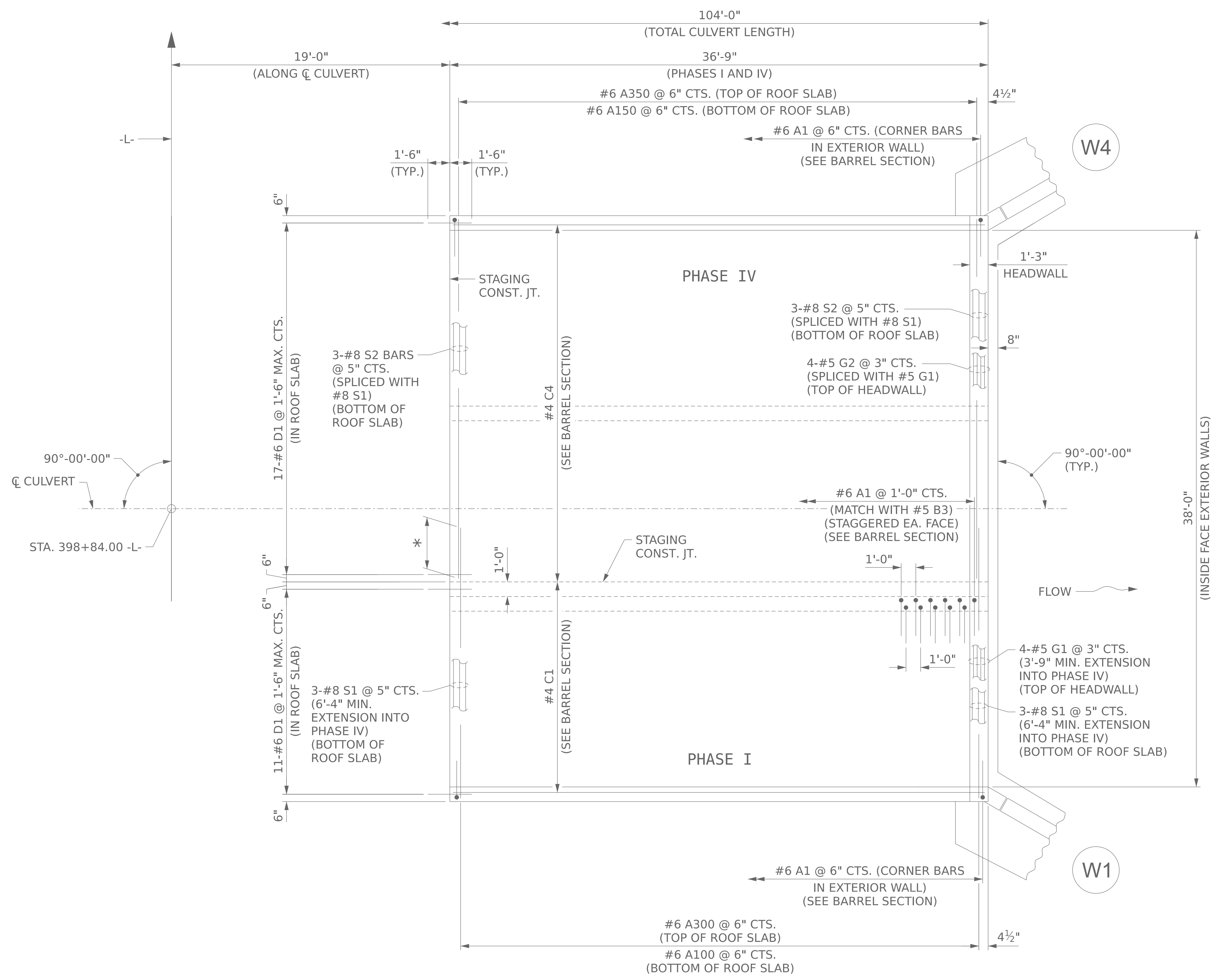
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW
 (PHASES I - IV)**

DRAWN BY : D. D. LOWERY DATE : 02/2024
 CHECKED BY : C. T. POOLE DATE : 02/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 02/2024

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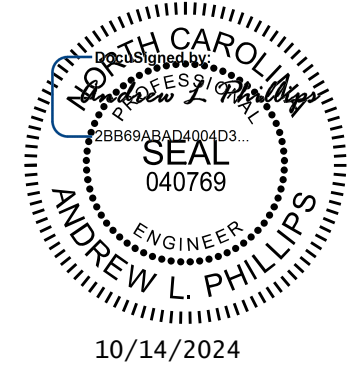
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REVISIONS					SHEET NO. C1-7
NO.	BY:	DATE:	NO.	DATE:	
1			3		TOTAL SHEETS
2			4		13



ROOF SLAB PLAN - PHASE I AND IV
 * EXTEND #6 A300 4'-10" INTO PHASE IV IN TOP OF FLOOR SLAB
 EXTEND #6 A100 4'-10" INTO PHASE IV IN BOTTOM OF FLOOR SLAB

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 8 OF 13



Kimley»Horn
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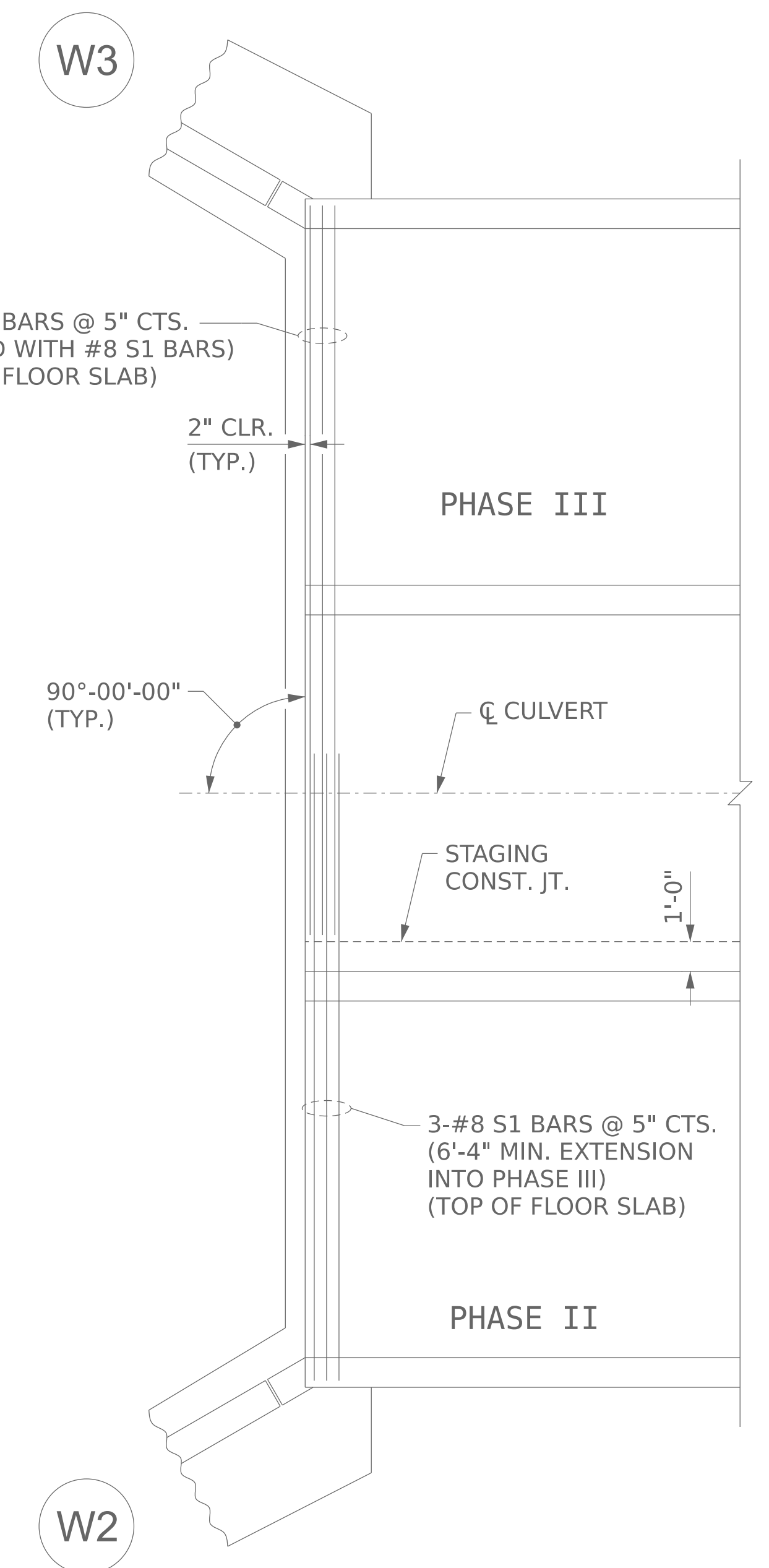
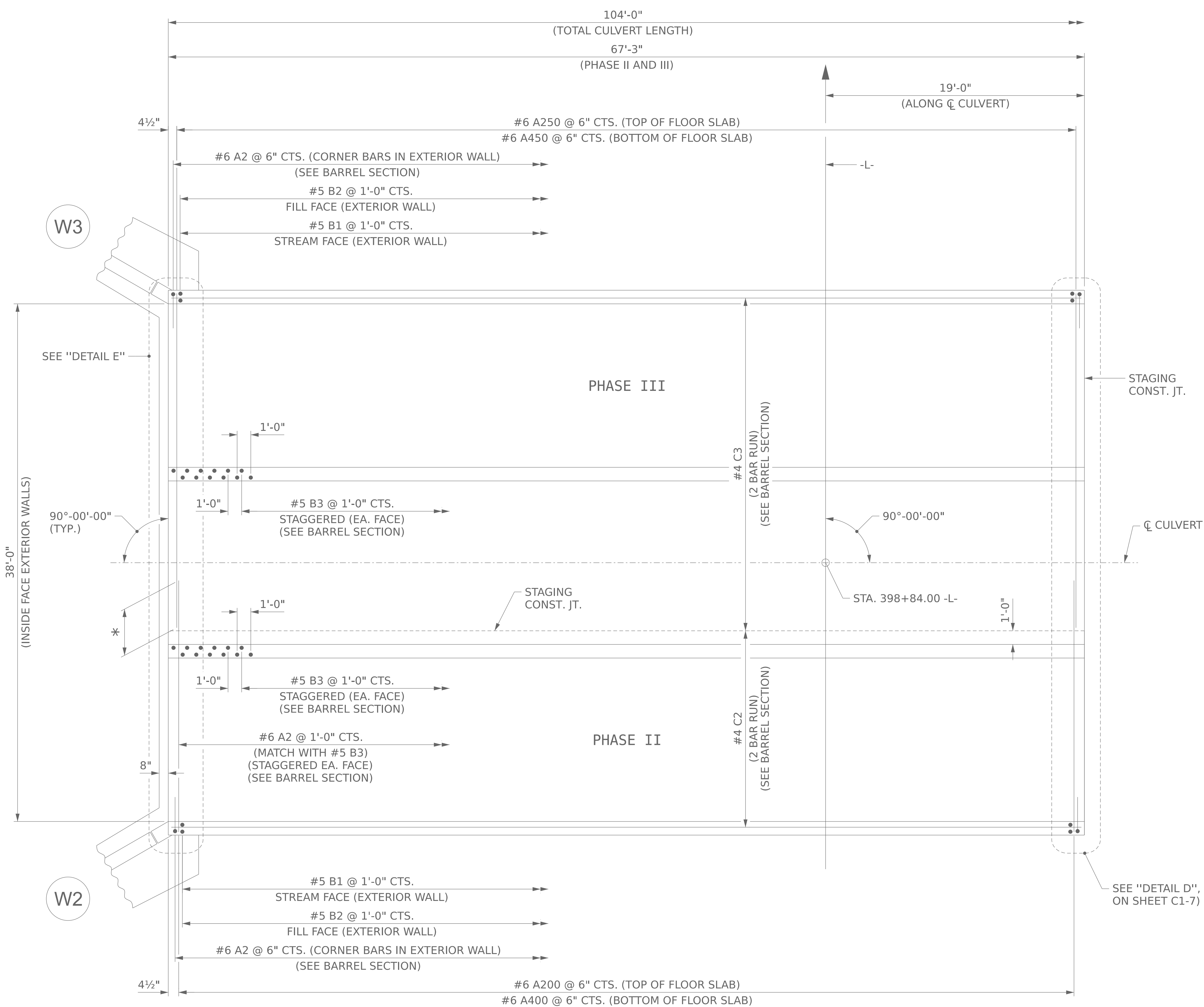
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW
 (PHASES I AND IV)**

DRAWN BY : D. D. LOWERY DATE : 02/2024
 CHECKED BY : C. T. POOLE DATE : 02/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 02/2024

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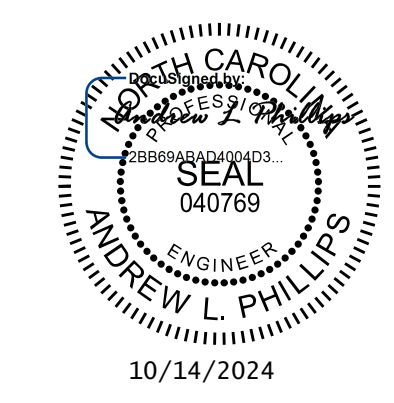
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	TOTAL SHEETS
1			3		13
2			4		



FLOOR SLAB PLAN - PHASE II AND III

* EXTEND #6 A200 3'-9" INTO PHASE III IN TOP OF FLOOR SLAB
 * EXTEND #6 A400 3'-9" INTO PHASE III IN BOTTOM OF FLOOR SLAB

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 9 OF 13



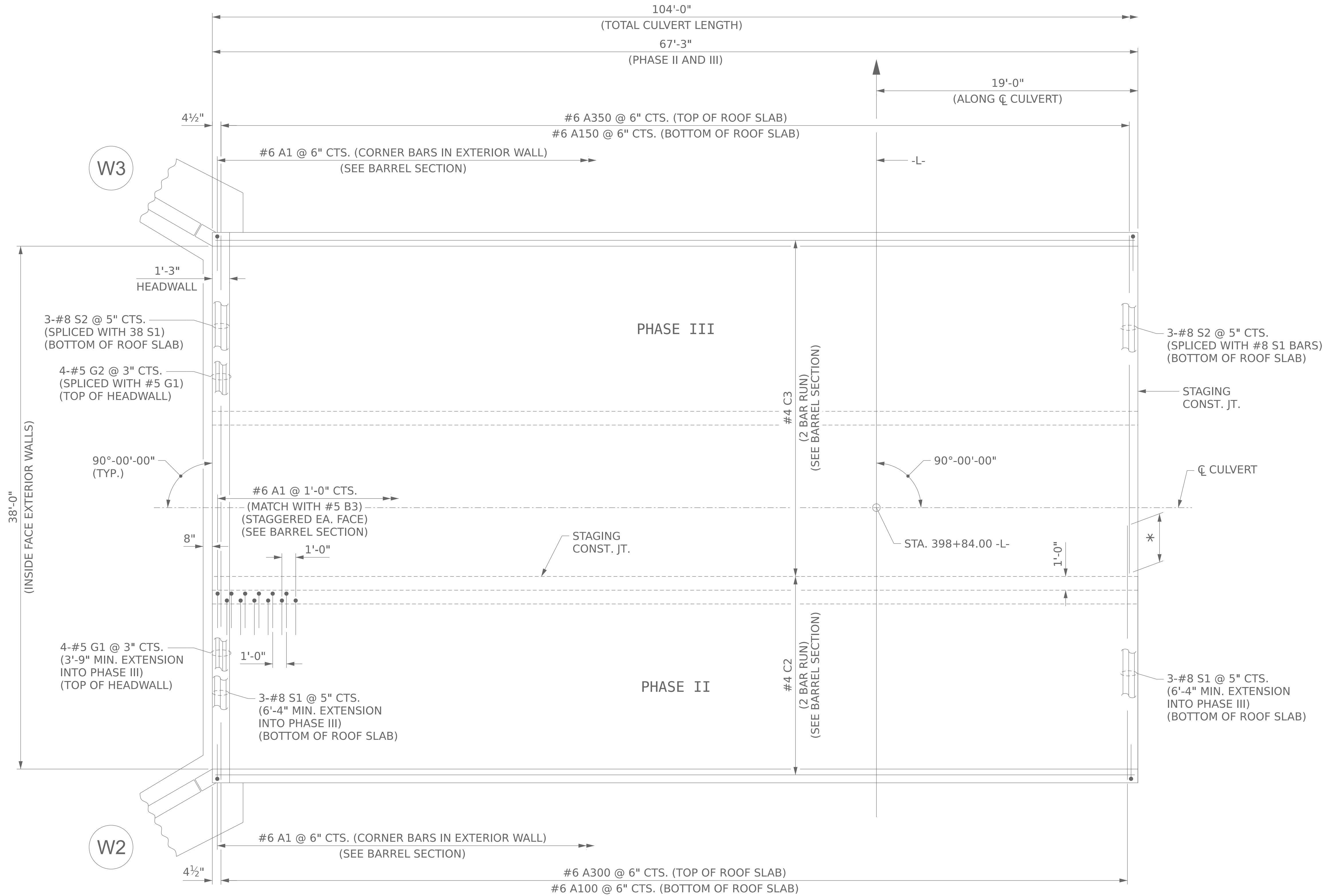
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW
 (PHASES II AND III)**

DRAWN BY: D. D. LOWERY DATE: 02/2024
 CHECKED BY: C. T. POOLE DATE: 02/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 02/2024

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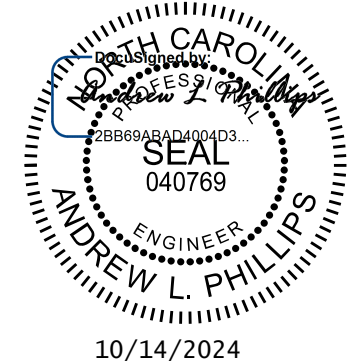
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			13
2			4			



ROOF SLAB PLAN - PHASE II AND III

* EXTEND #6 A300 4'-10" INTO PHASE III IN TOP OF FLOOR SLAB
 * EXTEND #6 A100 4'-10" INTO PHASE III IN BOTTOM OF FLOOR SLAB

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 10 OF 13



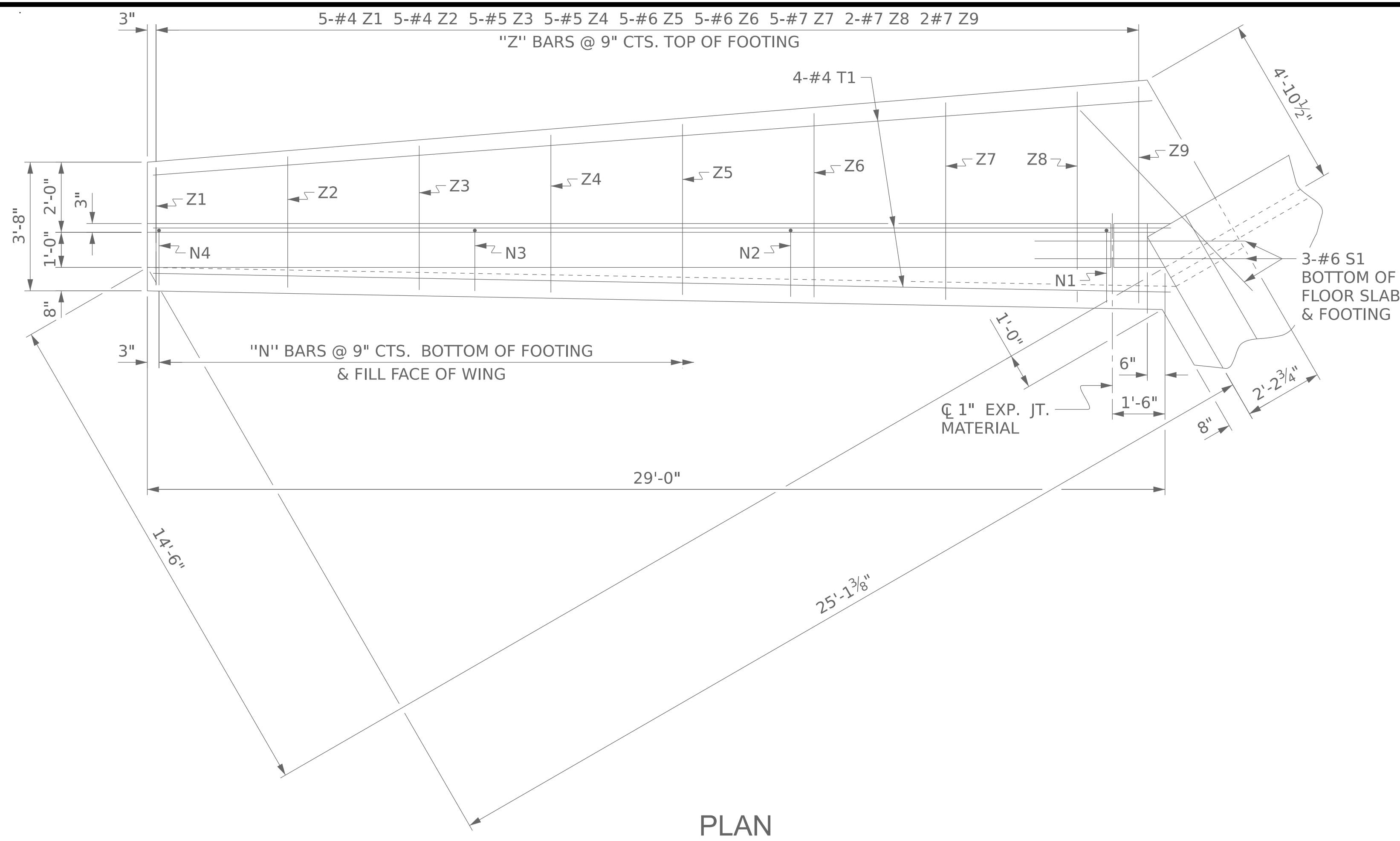
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**TRIPLE 12 FT. X 11 FT.
 CONCRETE BOX CULVERT
 90° SKEW
 (PHASES II AND III)**

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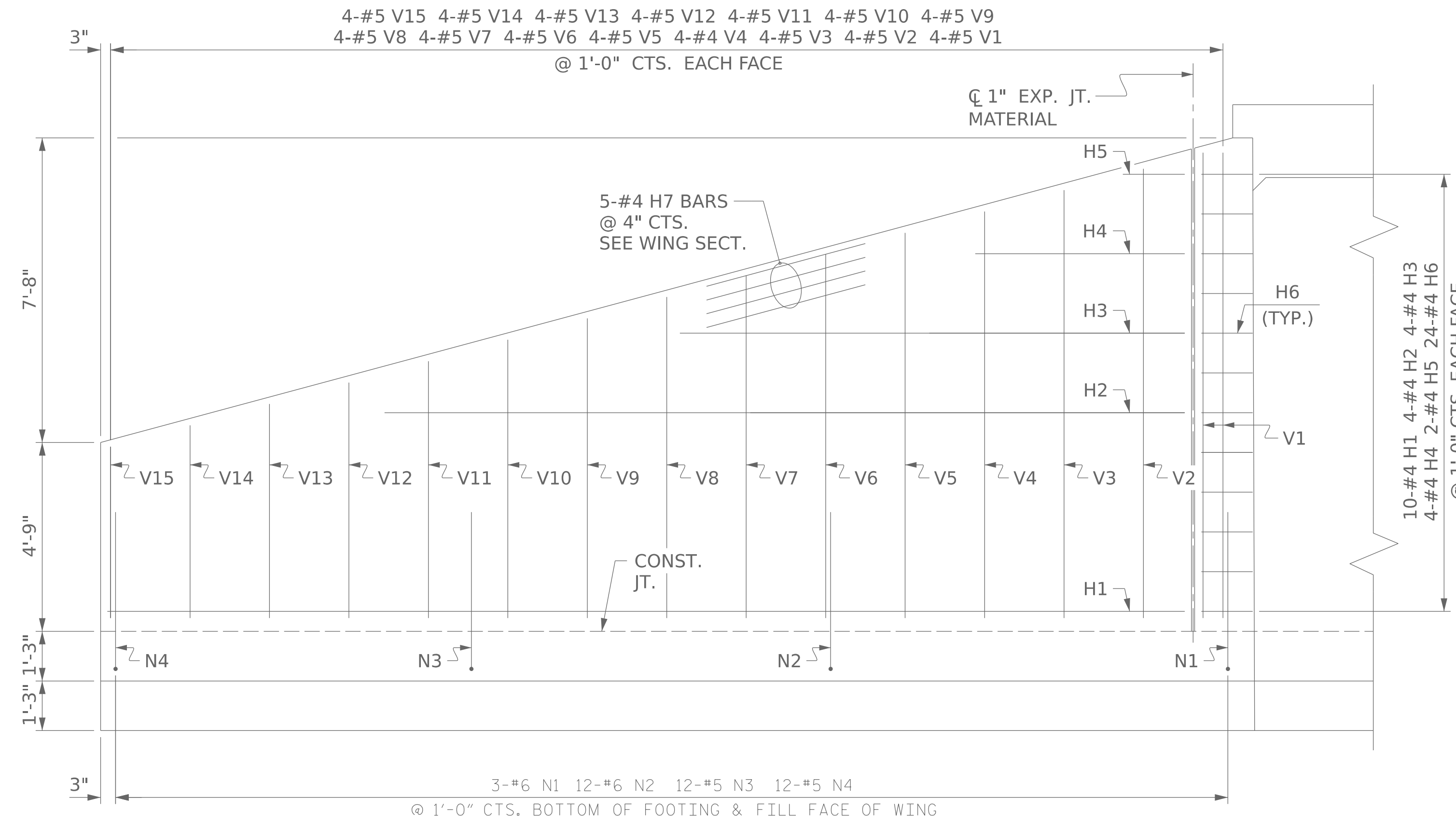
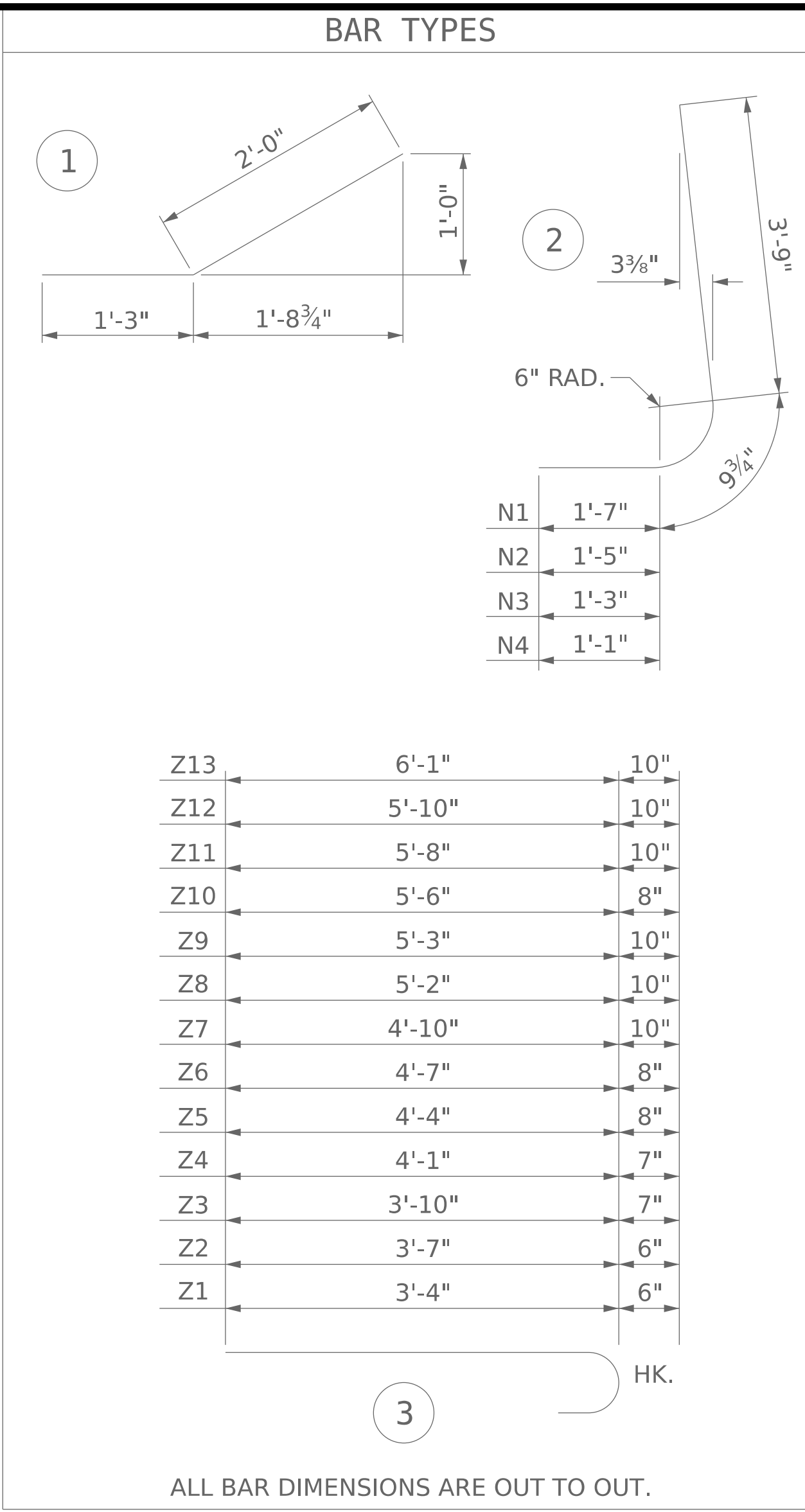
REVISIONS					SHEET NO. C1-10
NO.	BY:	DATE:	NO.	DATE:	
1			3		TOTAL SHEETS 13
2			4		

DRAWN BY: D. D. LOWERY DATE: 02/2024
 CHECKED BY: C. T. POOLE DATE: 02/2024
 DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 02/2024

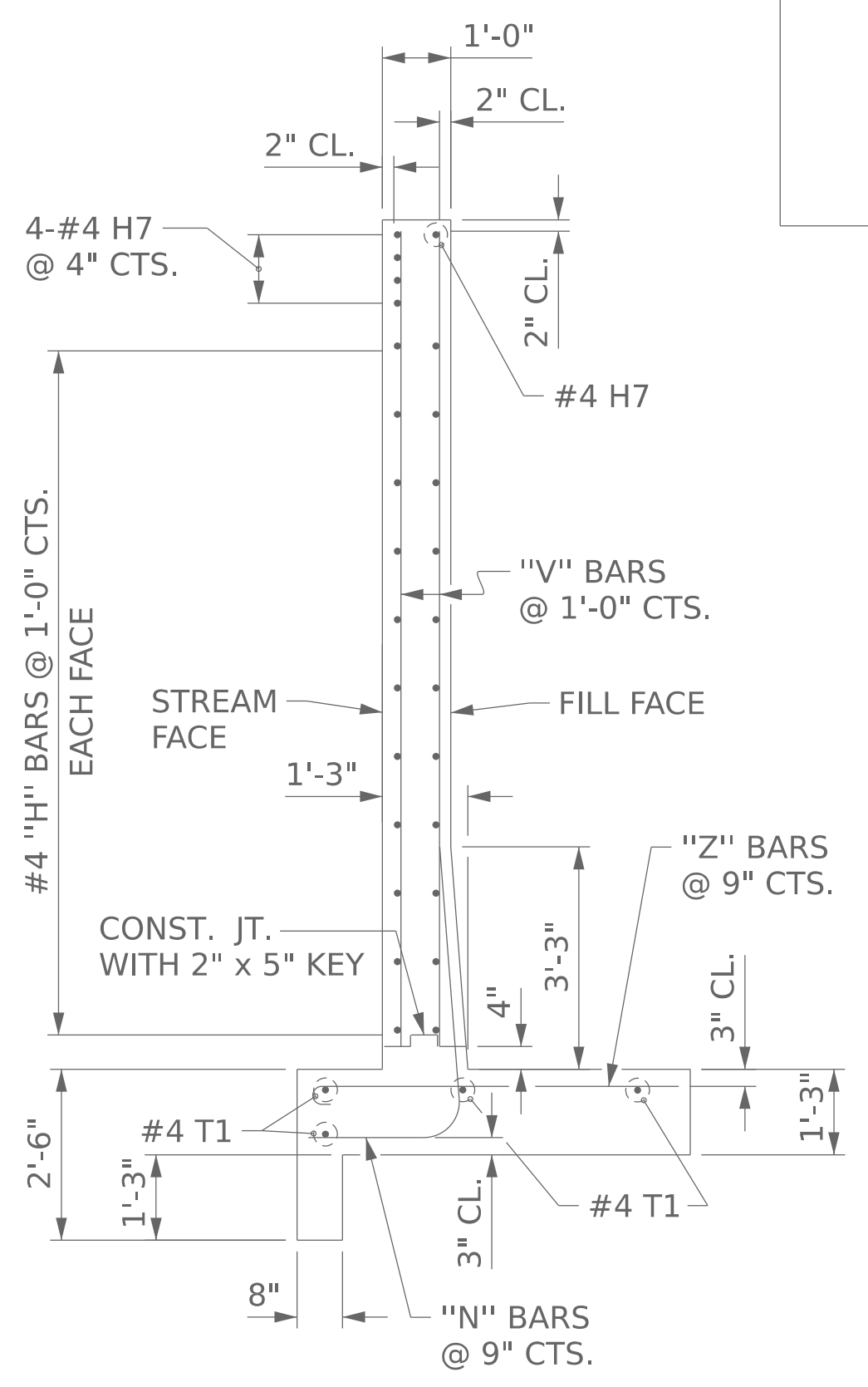


PLAN

PHASE 1 (W1)	
EPOXY COATED REINFORCING STEEL FOR 1 WING	1,640 LBS
CLASS A CONCRETE	
1 WING	17.7 CY
1 HEADWALL	0.9 CY
1 END CURTAIN WALL	0.8 CY
TOTAL	19.4 CY
PHASE 2 (W2)	
EPOXY COATED REINFORCING STEEL FOR 1 WING	1,640 LBS
CLASS A CONCRETE	
1 WING	17.7 CY
1 HEADWALL	0.9 CY
1 END CURTAIN WALL	0.8 CY
TOTAL	19.4 CY
PHASE 3 (W3)	
EPOXY COATED REINFORCING STEEL FOR 1 WING	1,640 LBS
CLASS A CONCRETE	
1 WING	17.7 CY
1 HEADWALL	1.4 CY
1 END CURTAIN WALL	1.4 CY
TOTAL	20.5 CY
PHASE 4 (W4)	
EPOXY COATED REINFORCING STEEL FOR 1 WING	1,640 LBS
CLASS A CONCRETE	
1 WING	17.7 CY
1 HEADWALL	1.4 CY
1 END CURTAIN WALL	1.4 CY
TOTAL	20.5 CY

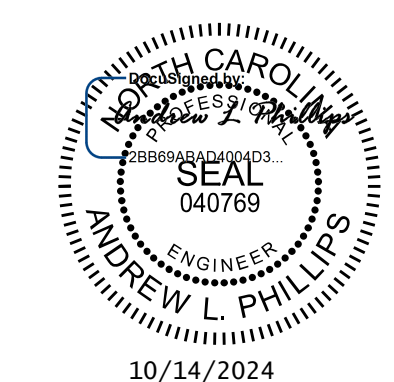


ELEVATION



TYPICAL WING SECTION

ALL BAR DIMENSIONS ARE OUT TO OUT.



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PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 11 OF 13

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS FOR CONCRETE BOX CULVERT
 H = 11'-0" SLOPE = 3:1
 90° SKEW

ASSEMBLED BY : D. D. LOWERY	DATE : 03/2024
CHECKED BY : A. L. PHILLIPS	DATE : 03/2024
DRAWN BY : AKP 11/04	REV. 6/19 MAA/THC
CHECKED BY : MKB 12/04	

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NO.	BY:	DATE:	DESCRIPTION:
1			
2			
3			
4			

SHEET NO.	C1-11
TOTAL SHEETS	13

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER	
						MOMENT				SHEAR					
						RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)		
DESIGN LOAD	HL-93 (INVENTORY)	N/A	①	2.52	--	1.75	2.52	1	EXTERIOR WALL	1.00	3.62	1	BOTTOM SLAB	0.00	
	HL-93 (OPERATING)	N/A		3.27	--	1.35	3.27	1	EXTERIOR WALL	1.00	4.69	1	BOTTOM SLAB	0.00	
	HS-20 (INVENTORY)	36.000	②	2.53	91.08	1.75	2.53	1	EXTERIOR WALL	1.00	3.62	1	BOTTOM SLAB	0.00	
	HS-20 (OPERATING)	36.000		3.28	118.08	1.35	3.28	1	EXTERIOR WALL	1.00	4.69	1	BOTTOM SLAB	0.00	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH		3.18	42.93	1.40	3.18	1	EXTERIOR WALL	1.00	11.00	1	EXTERIOR WALL	0.50	
		SNGARBS2		3.18	63.60	1.40	3.18	1	EXTERIOR WALL	1.00	9.57	1	BOTTOM SLAB	0.00	
		SNAGRIS2		3.18	69.96	1.40	3.18	1	EXTERIOR WALL	1.00	8.72	1	BOTTOM SLAB	0.00	
		SNCOTTS3		3.15	85.84	1.40	3.15	1	EXTERIOR WALL	1.00	5.53	1	TOP SLAB	0.00	
		SNAGGRS4		3.15	110.01	1.40	3.15	1	EXTERIOR WALL	1.00	5.37	1	TOP SLAB	40.00	
		SNS5A		3.15	111.98	1.40	3.15	1	EXTERIOR WALL	1.00	5.18	3	TOP SLAB	40.00	
		SNS6A		3.15	125.84	1.40	3.15	1	EXTERIOR WALL	1.00	4.84	1	BOTTOM SLAB	0.00	
	SNS7B		3.15	132.30	1.40	3.15	1	EXTERIOR WALL	1.00	4.70	3	BOTTOM SLAB	40.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3		3.16	104.28	1.40	3.16	1	EXTERIOR WALL	1.00	5.86	1	BOTTOM SLAB	0.00	
		TNT4A		3.16	104.52	1.40	3.16	1	EXTERIOR WALL	1.00	5.82	1	BOTTOM SLAB	0.00	
		TNT6A		3.15	131.04	1.40	3.15	1	EXTERIOR WALL	1.00	4.83	3	BOTTOM SLAB	40.00	
		TNT7A		3.15	132.30	1.40	3.15	1	EXTERIOR WALL	1.00	4.77	3	BOTTOM SLAB	40.00	
		TNT7B		3.15	132.30	1.40	3.15	1	EXTERIOR WALL	1.00	4.76	1	BOTTOM SLAB	40.00	
		TNAGRIT4		3.16	135.88	1.40	3.16	1	EXTERIOR WALL	1.00	4.50	1	BOTTOM SLAB	0.00	
TNAGT5A			3.16	142.20	1.40	3.16	1	EXTERIOR WALL	1.00	4.32	3	BOTTOM SLAB	40.00		
TNAGT5B		3.16	142.20	1.40	3.16	1	EXTERIOR WALL	1.00	4.29	3	BOTTOM SLAB	40.00			
EMERGENCY VEHICLE (EV)	EV2		3.41	98.04	1.30	3.41	1	EXTERIOR WALL	1.00	7.17	1	EXTERIOR WALL	0.00		
	EV3		3.38	145.34	1.30	3.38	1	EXTERIOR WALL	1.00	4.74	3	TOP SLAB	0.00		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

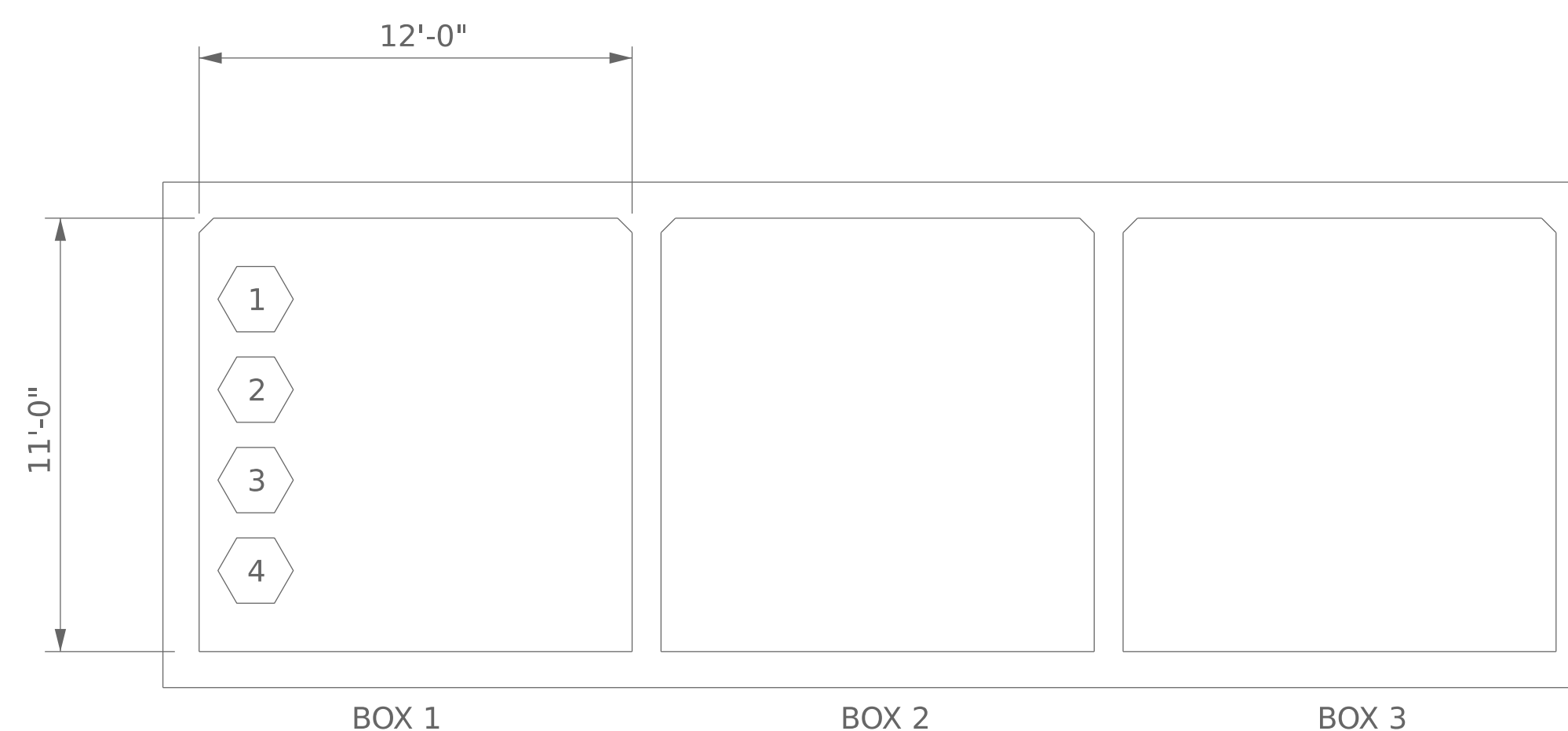
NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

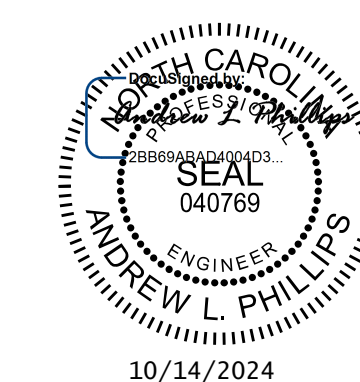
- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
④	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R-5809A
BERTIE COUNTY
 STATION: 398+84.00 -L-
 SHEET 12 OF 13



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)					
NO.		BY:		DATE:	
1		3		4	
2		4		13	
REVISIONS					SHEET NO. C1-12
TOTAL SHEETS					13

ASSEMBLED BY: D. D. LOWERY	DATE: 03/2024
CHECKED BY: A. L. PHILLIPS	DATE: 03/2024
DRAWN BY: WMC	7/11
CHECKED BY: GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC
REV. 04/23	BNB/AAI

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36 ----	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W _ _ _	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50 ----	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE AASHTO
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS ----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 3/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W ...	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE AASHTO
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$ " RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.